



## Ecologically Friendly Inventions

A company called Spilkleen in North York, Ont. is making great strides in the chemistry of absorbent materials. This company was founded in 1976 as a family effort to promote the scientific thinking of their youngest son, Ragui Ghali. The company was originally in Concord, Ont. and called Uthane Research.

Ragui Ghali's inventions have been very significant and they involve using materials that are filling our landfills, to actually clean up the environment. Absorbent materials have many applications, such as absorbing oil spills and, believe it or not, dehydrating chicken manure. The first significant product developed by Ghali while working in his new lab for insulating and packaging foam called Icynene. Icynene is based on the technology of chemically cross-linking isocyanurate, urea, and urethane molecules together in a three-dimensional polymeric matrix. The isocyanurate molecules allow for high-temperature stability. Urea leads to fire resistance. Flexibility is achieved with urethane. It is cheaper than other insulating materials, will not burn in normal air, has no odour and will not release toxic substances.

The next product that this inventor developed was called Spilkleen. Believe it or not, it is made from mainly old phone books. The key ingredient is the cellulose in the phone books. The phone books are finely shredded and mixed with binders to stop them from swelling when they absorb liquids. The absence of swelling enables Spilkleen to absorb liquids, through wicking action, and to hold onto the liquid without it leaking out again. This product is 1/3 the volume and mass of clay absorbents. Spilkleen is also easier to handle and more efficient to transport and store, and it is biodegradable, environmentally friendly and non-toxic - not to mention, it helped find a purpose for old phone books!

After further refining Spilkleen, it was discovered that this product could clean up environmentally disastrous oil spills. The sawdust-like material absorbs all of the oil and no water, after which it can be removed from the water surface.

This is not all, however, Ragui Ghali is now working on developing a material called Ultra-Absorbent, also made from waste cellulose that will absorb 2000 times its own mass in water turning it to a gel. His hope is that oil tankers could someday transport oil in gel form preventing any leakage if the ship's contents were to spill. If there was leakage the oil would float in this gel form until it could be towed away like an iceberg. To date Ultra-Absorbent has been used to dehydrate chicken manure allowing for easier transport, thus increasing its demand by the fertilizer industry. What farmers were once paying people to remove to landfill sites is now being used very efficiently thanks to this invention.

This is one story of a scientist in Canada using waste to develop materials that benefit the environment.